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EXAMINER

WILLS, MONIQUE M

| | |
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| ART UNIT | PAPER NUMBER |
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1746

DATE MAILED: 01/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/864,890

Applicant(s)

SKOTHEIM ET AL.

Examiner

Monique M. Wills

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-21 and 23-54 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 30-35, 37, 53 and 54 is/are allowed.
- 6) ☒ Claim(s) 16-21, 23-29, 36 and 38-52 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 May 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: ____.

DETAILED ACTION

Response to Amendment

This Office Action is responsive to the amendment filed October 24, 2005. Claims 30-35, 37 and newly added 53-54 are allowable over the prior art of record. However, the following rejections are maintained:

- Claims 16-17, 19-21, 36, 38 & 40 under 35 U.S.C. §102(b) as being anticipated by Kawakami et al, U.S. Patent 5,824,434.
- Claims 21, 23-29, 41, 45-48 & 50-51 under 35 U.S.C. 102(e) as being anticipated by Chu et al., U.S. Patent 6,402,795.
- Claim 18 under 35 U.S.C. 103(a) as being unpatentable over Kawakami et al, U.S. Patent 5,824,434 in view of Zhuang et al., The Reaction of Lithium with Carbon Dioxide Studied by Photoelectron Spectroscopy Surface Science, 1998.

New grounds of rejection necessitated by amendment are as follows:

- Claims 42 & 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al., U.S. Patent 6,402,795 in view of Zhuang et al., The Reaction of Lithium with Carbon Dioxide Studied by Photoelectron Spectroscopy Surface Science, 1998.

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- Claims 39 & 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami et al, U.S. Patent 5,824,434.
- Claims 43 & 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al., U.S. Patent 6,402,795.

Request for Continued Examination

The Applicant has requested that the finality of the office action mailed on August 2, 2004 be removed because of four new grounds of rejection to Kawakami, Chu, Brodd and Stachoviak. However, this office action states in both the "response to amendment" and "response to argument" sections that these rejections are on new grounds and there is no indication of finality in the "conclusions", PALM or the PAIR system. The finality status was erroneously indicated on the Office Action Summary, however, it is clear from several references to "new ground" rejections in the office action, the lack of finality statement in the "conclusions" and the appropriate status in both PALM and PAIR that this office action was in fact Non-Final. Therefore, if the Applicant seeks to withdraw the RCE, it is suggested that an appropriate petition is filed.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 16-17, 19-21, 36, 38 & 40 are rejected under 35 U.S.C. 102(b) as being anticipated by Kawakami et al, U.S. Patent 5,824,434.

With respect to claims 16, 21 & 38, Kawakami teaches an anode for an electrochemical cell comprising a lithium metal layer (col. 22, ll 62-68) coated with nitrogen gas (col. 23 ll 36-42) and a current collector substrate (col. 21, lines 28-32). The limitation with respect to lithium metal being “co-deposited in-situ with one or more gaseous materials” is not given patentable weight, because the presence of process limitations in product claims, where the product does not otherwise patentably distinguish over the prior art, cannot impart patentability to the product. In re Stephens 145 USPQ 656 (CCPA 1965). Furthermore, the claim only differs from Kawakami by its method of production. In accordance with MPEP 2113, “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend

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on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.”

In re Thorpe, 777F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Therefore, since the process steps are not given patentable weight, the method limitations of claim 1 do not patentably distinguish the instant anode from that of Kawakami.

With respect to claim 17, the gaseous material is nitrogen (col. 23 ll 36-42).

Concerning claim 19, the substrate 005, is an insulator made of polymer film (col. 27, lines 5-10).

With respect to claim 20, the anode further comprises: a multi-layered structure including an electrolyte layer 006 and conductive layer 003; an anode active layer 001; and a substrate insulator 005 interposed there between. See Figure 8 and column 23 lines 64-68 through column 24, lines 1-5. With respect to claim 40, the insulating layer is a polymer (col. 24, lines 55-60).

With respect to claims 16 and 36, the cathode material includes lithium manganese oxide. See Example 2-1.

Therefore, the instant claims are anticipated by the prior art set forth.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 21, 23-29, 41, 45-48 & 50-51 are rejected under 35 U.S.C. 102(e) as being anticipated by Chu et al., U.S. Patent 6,402,795.

With respect to claim 21, Chu teaches a negative electrode comprising a protective layer, lithium metal layer and current collector substrate (abstract). The current collector is a metallized plastic sheet or other metallized insulating sheet (col. 3, lines 18-25). The protective layer is a modifier/network former glass having the general formula $(M_2O)X(A_nD_m)$ where M is an alkali metal, A is boron, aluminum, silicon or phosphorous & D is oxygen or sulfur. Specific examples include lithium oxides, such as, Li_3BO_3 , $Li_2OB_2O_3$, Li_3AlO_3 or $Li_2OAl_2O_3$. See column 9, lines 50-55.

In re claims 23, 26-28 & 48, the claims are product-by-process claims rendering the same product as the prior art. The claims only differ from Chu

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by their method of production. In accordance with MPEP 2113, "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Therefore, since the process steps are not given patentable weight, the method limitations of claims 23, 26-28 & 48, do not patentably distinguish the anode active material from that of Chu.

Regarding claim 24, the anode substrate is a current collector made of a metallized plastic sheet. See column 3, lines 18-25.

In re claims 25-26 & 29, the reference teaches an electrochemical cell comprising: an electroactive sulfur-containing cathode (col. 13, lines 30-40); an anode comprising a lithium layer with a current collector substrate (abstract) and a lithium oxide layer (col. 9, lines 50-55); and an electrolyte interposed between the anode and cathode (col. 11, lines 49-60 & Fig. 1).

As to claims 41 & 45, the anodic material may contain a mixture of reaction products such as lithium oxide and lithium sulfide, therefore providing a reaction product dispersed within the anode active layer (col. 9, lines 55-65). Stated differently, the mixture contains a lithium sulfide anode layer dispersed with a lithium oxide reaction product.

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With respect to claim 46, the reaction product is lithium oxide (col. 9, lines 55-60).

As to claims 50 & 51, the cell is primary or secondary (col. 2, lines 60-68).

With respect to claim 47, the cathodic material is an electroactive sulfur-containing material (col. 13, lines 20-30).

Therefore, the instant claims are anticipated by Chu.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami et al, U.S. Patent 5,824,434 in view of Zhuang et al., The Reaction of Lithium with Carbon Dioxide Studied by Photoelectron Spectroscopy Surface Science, 1998.

Kawakami teaches a method of making a multi-structured anode as described in the §102 (b) rejection hereinabove. The reference also teaches surface treating lithium metal with nitrogen (col. 23 ll 36-42).

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Kawakami does not expressly disclose co-depositing lithium metal with carbon dioxide.

Zhang teaches that it is conventional to treat lithium anodes with carbon dioxide to produce elemental carbon on the surface of the anode (page 146).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ carbon dioxide gas of Zhang, to treat the lithium metal electrode of Kawakami, in order to increase conductivity of the anodic material.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 42 & 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al., U.S. Patent 6,402,795 in view of Zhuang et al., The Reaction of Lithium with Carbon Dioxide Studied by Photoelectron Spectroscopy Surface Science, 1998.

Chu teaches a negative electrode comprising a protective layer, lithium metal layer and current collector substrate as described in the §102 (e)

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rejection hereinabove. The protective layer is a modifier/network former glass having the general formula $(M_2O)X(A_nD_m)$ where M is an alkali metal, A is boron, aluminum, silicon or phosphorous & D is oxygen or sulfur.

Chu does not expressly disclose co-depositing lithium metal with carbon dioxide.

Zhang teaches that it is conventional to treat lithium anodes with carbon dioxide to produce elemental carbon on the surface of the anode (page 146).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ carbon dioxide gas of Zhang, to treat the lithium metal electrode of Chu, in order to increase conductivity of the anodic material.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 39 & 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami et al, U.S. Patent 5,824,434.

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Chu teaches a negative electrode comprising a protective layer, lithium metal layer and current collector substrate as described in the §102 (e) rejection hereinabove.

Chu does not expressly disclose an anode thickness of 2 to 100 microns (claim 39) or a multilayer structure with a substrate between the additional layer and anode active layer (claim 44).

However, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to modify Chu's anode to a thickness of 2 to 100 microns, since such a modification would have involved a mere change in the size of the anode. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

Kawakami teaches a mutli-layered anode comprising an active layer, insulating layer and conductive substrate (col. 24, lines 1-10) , but does not disclose the substrate between the active layer and additional layer. However, this arrangement would have been obvious to one of ordinary skill in the art at the time the invention was made, since it has been held that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 43 & 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al., U.S. Patent 6,402,795.

Chu teaches a negative electrode comprising a protective layer, lithium metal layer and current collector substrate as described in the §102 (e) rejection hereinabove.

Chu does not expressly disclose an anode thickness of 2 to 100 microns (claims 43 & 52).

However, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to modify Chu's anode to a thickness of 2 to 100 microns, since such a modification would have involved a mere change in the size of the anode. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

Allowable Subject Matter

Claims 30-35, 37 & 53-54 are allowable of over the prior art of record, because the prior art is silent to a method of making an anode of an electrochemical cell in a vacuum chamber including providing a reactive gaseous material adjacent to the lithium deposition nozzle. The prior art, such as Brodd, clearly teaches that the gaseous atmosphere is non-reactive to the lithium metal. See column 7, lines 28-30.

Response to Arguments

With respect to claims 16-17 & 19-20 being rejected under 35 U.S.C. §102(b) over Kawakami et al. U.S. Patent 5,824,434, the Applicant contends that Kawakami does not anticipate the instant claims because according to the affidavit under 37 C.F.R. 1.132, superior results are obtained when co-depositing gaseous material and lithium on a substrate. However, the rejection can not be overcome because evidence of secondary considerations, such as unexpected results or commercial success, is irrelevant to 35 U.S.C. 102 rejection. See *In re Wiggins*, 488 F.2d 538, 543, 179 USPQ 421, 425 (CCPA 1973)

Concerning the rejection under 35 USC 102(e) as being anticipated by Chu, the Applicant contends that this rejection is moot, because "Chu teaches

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a protective layer that may comprise lithium oxides, the protective layer is not an anode active layer, and is separate and distinct from the anode active layer that is sandwiched between the protective layer and current collector". This argument is not persuasive as the protective layer is made from the same material and employed in the same environment set forth in the instant claims. Therefore, irrespective of the labeling used to describe lithium oxide, such as "protective layer" or "anode active layer", the lithium oxide satisfies the instant claims because it has the identical structure and employed in the same electrochemical environment as the instant claims. Support for this assertion is provided in MPEP 2112.01, " [where] [p]roducts of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, since Chu teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. See *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Monique Wills whose telephone number is (571) 272-1309. The Examiner can normally be reached on Monday-Friday from 8:30am to 5:00 pm.

If attempts to reach Examiner by telephone are unsuccessful, the Examiner's supervisor, Michael Barr, may be reached at 571-272-1414. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MW

12/30/05

A handwritten signature in black ink, appearing to read 'Michael Barr', with a long horizontal flourish extending to the right.

MICHAEL BARR
SUPERVISORY PATENT EXAMINER